Start up procedure for x-ray instrumentation

This checklist assumes the diffractometer and source are nominally intact and aligned from the previous session of use. Diffractometer, source slits, monochromator and such should not need adjustment. Take care when inside the hutch. Space is limited. Do not overtly bump anything.

Outside Hutch:
1. Check notebook, is there anything important from previous use?
2. Put on Radiation Badge. Check that area monitor is affixed to outside of hutch.
3. Turn on detectors, motor controllers, source and shutter electronics as needed. The source should display a yellow “interlock open” light. The shutter will not function.
4. Check filter status and make sure manual overrides are off.
5. Verify that Keithley multimeters are online. Verify that Oscilloscopes are online.
6. Login to main computer.
7. Open terminal window and load Spec with the `fourc` command. Answer any questions for Spec as it loads.
8. Begin interlock with the `enable_x-ray_interlock` command

Inside Hutch:
9. Check 2-theta detector position. If it is 0 deg (main beam), adjust detector position using Spec.
10. Check vacuum condition of flightpath. Note vacuum state and pump (if needed).
11. Verify that the lines for the gas cylinders are pressurized. The N2/air line must be P > 50 PSI for the x-ray filter actuator to function. He gas cylinder line is optional.
12. Visually inspect mono-chromator housing to verify lids and interlock.
13. Visually inspect source housing and shutters. Depress shutter button if needed.
14. Check that source thermocouple is really in place.
15. Turn on primary chiller, and secondary chiller if high power (over 600W) is to be used.
16. Note the temperature of the source prior to start up.

Outside Hutch:
17. Close sliding doors fully. Check that each side panel is firmly in closed. The source should now display a green “interlock closed” light.
18. Ask yourself if there is any reason X-rays should not be enabled.
19. Depress and hold green x-ray OFF button to show pre-set values for voltage and current. Adjust as needed. Typical low power values are -15kV and 10mAmp. Do not exceed 1050W (600W) with both (only primary) chillers running.
20. Press X-ray ON button. Source will begin ramping up potential first, and then current second to the preset values. Amber X-RAY ON lamp on top of hutch will be on.
21. Press Shutter ON button. The indicator light will turn red.
22. At this point there are X-rays inside the hutch. Take data as needed.

Preferred Method to break interlock.

Press X-ray OFF button, Shutter close button, and break interlock if you need to enter hutch. Re-establish by repeating steps above.

Shutdown procedure for x-ray instrumentation

1. Once X-rays are OFF, shut down electronics outside the hutch.
2. Wait 5 minutes
3. Turn off chillers inside hutch.